CLIMATE CHANGE GEOG/ENST 4351 Fall 2021

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Description

An interdisciplinary analysis of the complex issue of global climatic change. This course provides a detailed investigation of every aspect of one of the most challenging problems of our era: the physics and causes of change, the likely environmental and socio-economic impacts, and the politics and technologies behind mitigation and adaptation.

Course Text

Burch, Sarah L., and Sara E. Harris (2021). *Understanding Climate Change: Science, Policy, and Practice, 2nd ed.* University of Toronto Press.

Students will be assigned readings to complete *before each lecture*. Readings chosen from the academic literature will be available through either the Library or MyCourselink.

Evaluation Scheme

Midterm Examination	**25%**	October 18
Seminar Abstract	**5%**	October 20
Seminar	**15%**	November 17 – December 6
Summary Paper*	**5%**	December 6
Final Examination	**50%**	TBA

There will be one midterm test, plus a final examination. Both will be in an open-book format. Each student will conduct a 15-minute seminar in class. Students will also write an original paper of no more than five pages on the same topic as their seminar.

*Students may opt to take part in a class activity rather than completing the Summary Paper.

Lecture Times

Monday: 10:00 – 11:30

Wednesday: 10:00 – 11:30

GEOG/ENST 4351 Course Schedule

(subject to changes as necessary)

Date	Reading	Topic(s)
September 8	Chapter 1	Introduction
September 13	Chapter 2	*The Climate System*
September 15	Chapter 3	*Insolation and the Greenhouse Effect*
September 20	Chapter 4	*Albedo*
September 22	Chapter 5	*The Carbon Cycle*
September 26	No reading	*Climates of the Ancient Past*
September 29	Chapter 7a (pp. 123-132)	*Modelling the Climate System*
October 4	Chapter 7b (pp. 132-140)	*Modelling Climate Change*
October 6	Chapter 8	*Expected Climate Change*
October 11		**Study Week**
October 13		**Study Week**
October 18		**Midterm**
October 20	Levermann et al. (2013)	*Sea Level Rise*
October 25	Chapter 9	*Impacts on Natural Systems*
October 27	No reading	*Impacts on Marine Ecosystems*
November 1	Chapter 10	*Impacts on Food and Water*
November 3	Kahl and Stirratt (2012)	*Impacts on Human Systems*
November 8	Chapter 6a (pp. 99-117)	*Mitigation Strategies*
November 10	Chapter 6b (pp. 117-122)	*Decarbonization*
November 15	Chapter 11	*Policy Instruments*
November 17	Chapter 12	Seminars
November 22		Seminars
November 24		Seminars
November 29		Seminars
December 1		Seminars
December 6		Seminars

Learning Outcomes

Knowledge

- Identify the physical processes that produce global climatic changes
- Describe the climatological history of Earth and theory surrounding past changes
- Connect ongoing changes in the atmosphere with observed patterns of global and local climatic changes, and anticipate future changes in the system
- Summarize the expected effects that climatic change will have on human and natural systems, including water resources, agriculture, biodiversity, and sea level rise
- Appraise alternative options that could be implemented to mitigate anthropogenic interference in the climate system
- Compare policy mechanisms and multilateral regimes for implementing mitigation options

Skill Development

- Consideration of uncertainty in decision-making
- Critical analysis of scientific literature and its significance
- Effective communication of scholarly research in both written and verbal formats

Course Delivery

In accordance with the safety protocols at Lakehead University during the pandemic of Fall 2021, this course will be delivered using on-line methods. The primary mode of contact will be synchronous lectures during the scheduled time periods each week.

Course materials and tests will be delivered through the **Desire2Learn** platform at MyCourselink. Lectures will be hosted by the instructor using the **Zoom** platform; links to the sessions are in the MyCourseLink Calendar. Class activities will be shared among classmates using **Google Docs**.

Recordings of **Zoom** lectures and **Google Docs** will be made available asynchronously for students who are unable to attend the lectures at the scheduled times, due to technological limitations or other reasons. Students are responsible for keeping up with the class.

LU Notice for Recording Lectures and Class Activities

In GEOG/ENST 4351, in the context of remote instruction and participation, video and audio recordings of class activities will be made to ensure students' and instructors' easy and comprehensive access to those activities. The recordings are confidential and are intended only for the use of the course students and instructors. They may otherwise not be used or disclosed. During recording, to protect others' privacy, each student should ensure that no one else is present in the location where they are being recorded without that non-student's consent. The recordings are made under the authority of sections 3 and 14 of The Lakehead University Act, 1965. Questions about the collection of the images and sounds in the recordings may be directed to the Dean of Science and Environmental Studies, ses@lakeheadu.ca.

LU Accommodation Statement

Lakehead University is committed to achieving full accessibility for persons with disabilities/medical conditions. Part of this commitment includes arranging academic accommodations for students with disabilities/medical conditions to ensure they have an equitable opportunity to participate in all of their academic activities. If you are a student with a disability/medical condition and think you may need accommodations, you are strongly encouraged to contact Student Accessibility Services (SAS) and register as early as possible. For more information, please email sas@lakeheadu.ca or visit https://www.lakeheadu.ca/faculty-and-staff/departments/services/sas.

GEOG/ENST 4351 Student Research Projects

Introduction

4351 is a course loaded with content from the instructor. However, as a fourth-year course it is expected that students will seek out exposure to a wider range of knowledge and viewpoints. These seminars provide the opportunity for each student to gain familiarity with an area of current research related to global climate change. The goal of the project is to present new material to the class and solicit opinions and discussion.

Teams

There are sufficient timeslots for all of the research projects to be completed by teams of two students. In some cases students may prefer to work as a team of three; this in turn opens up the opportunity for other students to work alone. **Please notify the instructor of your team preference as soon as possible.**

Material

The basis for each project is ***current research***, represented by articles chosen from academic journals and emphasizing ones that were published within the last 10 years. **This research must go beyond what is covered in the course.**

Your sources should be primarily **peer-reviewed journal articles**; you are expected to make use of **at least three per team member**. Reports from the "grey literature" (unpublished manuscripts, conference proceedings, government reports, etc.) will be acceptable as **secondary** sources. Magazines, newspapers, web sites, etc. will generally **not** be considered useful.

Look for articles that cover the same or closely related subjects but also *complement* rather than duplicate each other. Consider both quality and quantity of papers in your research; 6-10 should be sufficient, but you must acquire a good grasp of a subject that is new and interesting.

Seminar Abstract

An abstract is a short and pithy summary of a work. The abstract for your seminar will introduce the main topic, the sources of information, and the key findings that will be presented. It should consist of summary statements, not opinions or plans. The abstract must be **250 words** or less and include at least two peer-reviewed references.

Seminars

You will be allotted **20 minutes** of class time to share your research with your peers. You may organize your seminar in many ways: presentations, discussions, games, debates, etc.

Seminars will be evaluated according to the following criteria:

- Was the seminar well-organized? Was it clear that the presenter understood the material?
- Was the material new and interesting? Did the presenter include his/her own insight and opinions?
- Was it pitched at a level appropriate to the class? How well did it solicit participation from the other students?
- Was the delivery professional? Was originality or creativity evident?

You may make use of software tools that belong to or are compatible with the **Zoom** platform. Any video content must be five minutes or less.

Please note that since seminar material may be included on the final exam, continued attendance of these sessions is expected. It is my intention that seminars be recorded so that they may be viewed or reviewed asynchronously if necessary.

Papers

You will write a summary paper on your seminar topic of approximately **1500 words per team member** (roughly five pages in length at 1.5 line spacing). The paper should review and synthesize material you have collected for that topic along with your own insights.

While this is a short paper, it should still have a formal style ***beginning with its own abstract and ending with a concluding section***. Tables, figures, and the reference list are not included in the page limit.

Remember to cite your sources within your paper! Failure to refer to your sources constitutes plagiarism. All papers are to be fully referenced using the author-date style of referencing (e.g.: Hanson et al. 2008). If you are unsure of how to do this, follow the format described in the Department of Geography and the Environment Undergraduate Thesis Manual, available through the department web site:
https://www.lakeheadu.ca/academics/departments/geography/thesis

Even with proper citations, simply repeating ideas or copying text from the original source can still constitute plagiarism. The content of your paper must be your interpretation of the source material.

A shorter paper may seem like an easier task, but in practice it is often difficult to distill the material and opinions in your seminar into five pages of content. Focus your writing style. Papers will be evaluated according to:

- Content
- Analysis
- Writing style
- Formatting and referencing

Project Support

The Library provides considerable support for students conducting academic research and accessing reputable peer-reviewed literature. Contact Janice Mutz (Geography, jmutz@lakeheadu.ca) or Chris Thomasini (Orillia, ctomasin@lakeheadu.ca) for help refining your topic and locating the information that you need. They're much better than Google.

The Academic Support Zone (https://www.lakeheadu.ca/students/academic-success/student-success-centre/academic-support-zone) provides free consultation and coaching for writing and polishing your work.

Suggested Topics

Listed below are some suggested starting points for student research. **This list is not exhaustive**; you may decide on a topic that does not fit any of these categories. Topics will often be focussed on a particular region, sector, or ecosystem, but could also have an international or global scope.

You should discuss your topic with the instructor before the end of September in order to avoid duplication with other students, and to ensure that your topic is relevant and goes beyond the basic course material.

2021 United Nations Climate Change Conference (COP 26)
- National priorities and plans
- Commitments versus objectives
- Nongovernmental participation
- History of negotiations and emissions

Climatology
- Paleoclimatology
- Global observation networks
- Emissions projections
- Climate models

Impacts
- Agricultural impacts
- Forest impacts
- Sea level rise
- Water resource impacts
- Biodiversity
- Biological surprise
- Polar impacts
- Disease
- Economic costs

Mitigation
- Setting targets for emission reductions
- Policy mechanisms
- Ethics and politics
- International cooperation
- Public perspectives